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Japanese Maple Scale: A Pictorial Guide for Identification

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Introduction

The Japanese maple scale, *Lopholeucaspis japonica* Hemiptera: Diaspididae (JMS), is an armored scale present in the eastern US since the 20th century. This pest has caused the nursey industry significant losses due to direct injury or plant rejection. Identify JMS can be difficult due to their biology. This factsheet serves as a pictorial guide to provide key features of this insect. For more information on JMS biology and management, please visit the following link: https://www.pubs.ext.vt.edu/ENTO/ento-550/ento-550.html

Life Cycle

JMS undergoes incomplete metamorphosis, encompassing three distinct life stages: egg, immature, and adult. A fertilized female JMS lays around 25 small, lavender-colored eggs, which are circular in shape (Fig. 1 & 2).

Figure 1. JMS eggs exposed (arrows) from under the test (Mollie Wyatt, Virginia Tech).

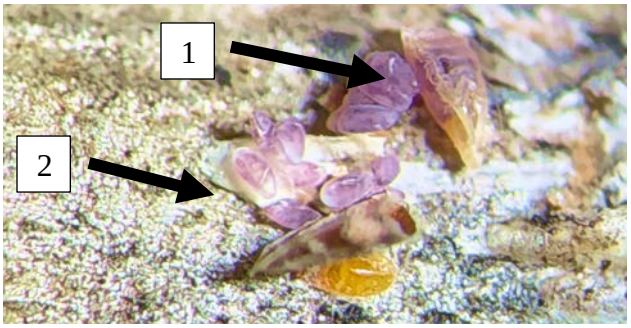

Figure 2. Arrow 1 pointing to female producing the eggs. Arrow 2 indicating freshly produced eggs (Mollie Wyatt, Virginia Tech)

Once hatched, JMS progresses through several developmental phases known as instars. Transitions from one instar to the next occur as the insect sheds its exoskeleton to accommodate growth. The initial instar following egg hatching is commonly referred to as a "crawler." These crawlers exhibit a lavender hue, a pear/ovate form, and possess six legs as well as a pair of antennae (Fig. 3 & 4).

Figure 3. Crawler under a stereoscope (Mollie Wyatt, Virginia Tech).

Figure 4. The underside of a crawler showing the legs and antennae using scanning electron microscope (Mollie Wyatt, Virginia Tech).

After hatching, the crawlers find a spot on the host plant, using their mouthparts to pierce the bark and initiate active feeding. The crawler then remains stationary in this position. During the first instar, they commence constructing a protective covering called a "test" (Fig. 5). This test comprises roughly equal parts of wax and non-waxy materials, adopting an oyster-shell shape with a typically grayish-white hue (Fig. 6). This coloration aids in blending with the surrounding bark of an infested plant (Fig. 7).

Figure 5. First instar flipped over with the arrow pointing to the freshly made wax around the lavender colored soft body (Mollie Wyatt, Virginia Tech).

Figure 6. Completed test production of 1st instar (Mollie Wyatt, Virginia Tech).

Figure 7. JMS infestation blending in with the bark (Mollie Wyatt, Virginia Tech).

As immature, JMS retract their legs and antennae and undergo 3-5 instars before reaching maturity as females or males. Following the first instar, adult females remain stationary at their original feeding site, enclosed under the test. The initial test from the first instar is shed, transitioning to a light brown to orangish color, which remains attached to the rear of the newly formed test (Fig. 8). Upon removing the white waxy coating, the exposed hardened skin underneath appears reddish-brown (Fig. 9). As adult females, the test ranges in size from 1.5-2.0 mm. To observe the actual soft body of the female, one must flip over the test. The female's body measures between 0.9-1.1 mm, retaining its lavender color yet adopting a more rounded shape, distinct from the pear-shaped appearance of the juvenile stages (Fig. 10).

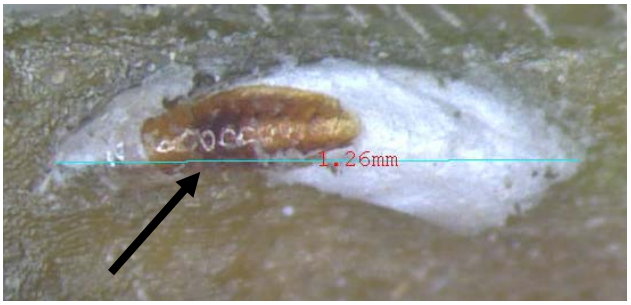

Figure 8. Second instar with the old, shed exoskeleton (arrow) attached to the back end of the test (Mollie Wyatt, Virginia Tech).

Figure 9. Wax covering rubbed off on test of JMS, resulting on exposed adults (arrow) (Mollie Wyatt, Virginia Tech).

Figure 10. Adult female exposed from under the test (Mollie Wyatt, Virginia Tech).

Upon reaching maturity, a male JMS will mate with a female. Subsequently, the female lays her eggs, continuing the life cycle. Even after the crawlers have emerged and the female has died off, the test remains attached to the plant, potentially complicating the distinction between active and old/previous infestations (Figs. 11 & 12).

Figure 11. An infested plant with old vacant tests marked by the arrows. The white tests are the new JMS infestation (Mollie Wyatt, Virginia Tech).

Figure 12. Highly infested plant with multiple overlap of JMS (Mollie Wyatt, Virginia Tech).

In contrast to females, male JMS undergo four to five instars, developing wings, antennae, and legs when reaching maturity (Fig. 13).

Figure 13. A male JMS with a missing antenna (Mollie Wyatt, Virginia Tech).

Monitoring

The initial step in identifying a JMS infestation involves scouting, followed by the need for consistent monitoring. For effective monitoring of active populations, the recommended technique is to use the “tape method.” This entails tightly wrapping white electrical tape around branches and/or main trunk of an infested tree, positioning the sticky side facing upwards. Figures 14 & 15 provide visual representations of the appearance of crawlers on the tape. Due to the minute size of the crawlers, it is crucial to avoid confusing them with specks of dirt or other debris that may accumulate on the tape. While under heavy infestations, it might be possible to spot them with the naked eye. However, using a hand lens (20 X) for verification remains important. Detecting extensive JMS infestations on trees might

be relatively straightforward yet identifying low population levels can be challenging. JMS is a destructive pest known for its polyphagous feeding habits, capable of consuming various types of plants. This includes over 60 different genera of dicotyledonous trees and shrubs across 35 families.

Figure 14. Tape gathered from a highly infested plant with hundreds of crawlers on it.

Figure 15. Close up of crawlers showing their distinctive shape on the tape (Mollie Wyatt, Virginia Tech).

Phenology

Tracking densities of JMS in an affected area will positively influence the timing of deployment of any control tactic. Visual scouting and/or the use of the tape method will aid to document the presence of this pest in a crop of interest over time. Data collected from one location near Charlottesville, Virginia in 2022 showed a consistent presence of crawlers from an infested crop (Fig. 16). Implications of having a prolonged presence of crawlers include the risk of re-infestation of the managed crop.

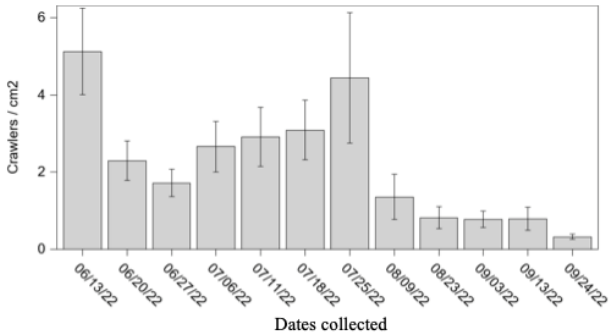

Figure 16. Average number ± standard error of crawlers per centimeter square captured on white electrical tapes placed at multiple infested trees near Charlottesville, Virginia, in 2022.

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2023 ENTO-572NP